



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,997	12/16/2005	Steffen Greiner	P2107-283	4674
2352 7590 02/22/2008 OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403				
EXAMINER				
PAGE, BRENT T				
ART UNIT		PAPER NUMBER		
1638				
MAIL DATE		DELIVERY MODE		
02/22/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/549,997

Applicant(s)

GREINER ET AL.

Examiner

Brent Page

Art Unit

1638

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 9, 12, 16 and 24-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11, 13-15 and 17-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
- Paper No(s)/Mail Date 9/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group III in the reply filed on 11/29/2007 is acknowledged. The traversal is on the ground(s) that the special technical feature "which unites all of applicants' claims" is the provision of transgenic plant wherein a first and second transgene are co-expressed. This is not found persuasive because claims 24 and 25, for example, do not contain any limitations involving transgenic plants, and furthermore refers only to a single isolated nucleic acid.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

Claims 1-8, 10-11, 13-15, and 17-23 objected to because of the following informalities: The claims still contain non-elected subject matter. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8, 10-11, 13-15, and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites in part a, "at least one of a cytosolic and a nucleus-located soluble pyrophosphatase". It is unclear whether Applicant is claiming a second transgene that is either a cytosolic OR a nucleus-located soluble

pyrophosphatase, or whether Applicant is claiming that the second transgene must encode two genes, one of a cytosolic and one of a nucleus-located soluble pyrophosphatase. For examination purposes the Examiner is interpreting the claim to mean a second transgene that may be a cytosolic OR a nucleus-located soluble pyrophosphatase.

Claim 1 also recites in part c "a transgenic beet plant having at least one of an increased sucrose content in the beet, an increased mersitem activity, an extended mersistem activity and a reduced rate of sucrose breakdown during storage". It is unclear whether Applicant is claiming that the transgenic beet must have one specific activity of each of the listed kinds of activity, or rather just one of the listed activities. For examination purposes, the Examiner is interpreting the claim to mean the latter.

The rest of the claims depend from Claim 1 and thus, are rejected on the same grounds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 10-11, 13-15, and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaxiola (WO0215674) in view of Sonnewald et al

(US patent 5492820 published 2/20/1996) and further, in view of Geigenberger et al (1998 Planta 205:428-437).

The claims are broadly drawn to a process for producing a transgenic sugar beet plant which comprises transforming a sugar beet cell with a first transgene encoding any vacuolar pyrophosphatase from any source, and a second cytosolic or (based on interpretation as discussed in the 112 2nd paragraph rejection above) nucleus-located soluble pyrophosphatase from any source, culturing and regenerating a transgenic beet plant from the cells, and obtaining a transgenic beet plant having increased sucrose content or increased meristematic activity, or extended meristematic activity or a reduced rate of sucrose breakdown, wherein the transgenes consist of "a" nucleotide sequence depicted in SEQ ID NO:1 and SEQ ID NO:4 respectively, wherein "a" nucleotide sequence is interpreted to mean any dinucleotide or larger sequence, and in the case of "a" sequence that is complementary thereto, any dinucleotide or larger sequence that is complementary to said sequences, and wherein the promoter comprises SEQ ID NO: 6 or "a" sequence that which is complementary thereto, wherein the promoter need comprise as little as a dinucleotide complementary to SEQ ID NO:6, wherein the first and second transgenes are arranged on a vector, wherein the vector is equipped for overexpressing at least one of the transgenes, wherein the transgenes are operatively linked to a promoter from *Beta vulgaris*, *Arabidopsis thaliana* or the cauliflower mosaic virus wherein the promoter is tissue-specific or constitutive or inducible wherein the tissue specificity is a storage-specific promoter, wherein said vector possesses other regulatory

elements, wherein the transgenes are arranged on a single vector and wherein the transgenes are transformed simultaneously, and harvesting material of the resultant transgenic plant.

Gaxiola teaches a method of making a transgenic plant with increased meristematic activity comprising transforming plants with a vector comprising a vacuolar pyrophosphatase (AVP1) operatively linked with the 35S cauliflower mosaic virus promoter (see claims 1-7 of WO0215674, for example) and other enhancer and regulatory elements (see claim 7, for instance), wherein AVP1 is overexpressed and results in plants with increased meristematic activity. Gaxiola also teaches that the AVP1 Gene may be expressed with other genes as evidenced by Example 10 discussing the double construct of AVP1 and AtNHX1. Gaxiola also mentions that any plant may be used in the claimed method steps (see page 7 beginning of 2nd full paragraph) and that roots may be targeted for overexpression (see top of page 8, for example). Furthermore, Gaxiola teaches the sequence of AVP1 which contains sequences that encode conserved domains of vacuolar pyrophosphatase which fulfill the limitation of "a" sequence depicted in SEQ ID NO:4.

Gaxiola does not teach the transformation of a cytosolic or nucleus-located soluble pyrophosphatase into plants, or a beta vulgaris promoter or a storage-specific promoter.

Sonnenwald et al teach the transformation of Tobacco plants with exogenous cytosolic pyrophosphatase resulting in plants with increased sucrose accumulation relative to non-transformed plants and also the transformation of

potato plants with exogenous cytosolic pyrophosphatase resulting in tubers with increased sucrose content and decreased starch content (see Example 1 in particular, claims 1-13, for example). Sonnewald et al also teach the operable linkage of the pyrophosphatase with a storage-specific promoter (see paragraphs 16-18, for example).

Geigenberger et al teach that the overexpression of pyrophosphorylase in the cytosol may lead to decreased vacuolar size and the reduction in vacuolar enzymes, and show that the phosphate dependent reactions of each are affected by each other (see page 436 middle of first column to end of page).

Given the state of the art and the teachings by Sonnewald et al, Geigenberger et al and Gaxiola it would have been obvious to one of ordinary skill in the art to modify the method taught by Gaxiola by adding the overexpressing of a cytosolic pyrophosphorylase taught by Sonnewald et al and as suggested by Geigenberger et al. It would have been appreciated by one of skill in the art to combine the known meristematic properties associated with vacuolar PPase with the known sucrose accumulating properties of cytosolic overexpression of PPase to get sucrose accumulation in transgenic sugar beets.

Deleted: ¶

Both Sonnewald et al and Gaxiola et al disclose that increased yield is a desired property in plants. One of ordinary skill in the art would have been motivated to increase the yield of sugar beets as suggested by Gaxiola et al and Sonnewald et al, by transforming a sugar beet as suggested by Sonnewald (mentions tuber-specific expression in the taproot of sugar beet, see paragraphs 10-13 of the summary of invention, for example), with the construct taught by

Gaxiola et al, and would have been motivated to decrease the Ppi in the cytosol by overexpressing the gene taught by Sonnewald et al, to allow the mersitematic activity and the sucrose accumulation. The simultaneous transformation of both genes and the storage-specific promoters are well known elements in the art that would have been recognized design choices for one of ordinary skill in the art. Given the state of the art, the teachings by Gaxiola et al, Sonnewald et al, and Geigenberger et al, one of ordinary skill in the art would have had a reasonable expectation of success, and would have been motivated to combine the elements of the prior art to increase yield of sugar beets. No claims are free of the prior art. No claims are allowed.

Deleted: ¶

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRENT PAGE whose telephone number is (571)272-5914. The examiner can normally be reached on Monday-Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571)-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brent T Page

/Russell Kallis/
Primary Examiner, Art Unit 1638